CHAPTER 2

Near-Term Strategy

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Background and Context of Chapter

Given the status of many salmon populations in the Lake Washington/Cedar/Sammamish Watershed, it is essential that specific near-term actions be taken to slow or even halt their decline and to establish a pathway to their recovery. To do this, the strategy of the Action Agenda is to offer opportunities to address the factors of decline for chinook salmon habitat, particularly in the subareas most critical to the course of the species' life history. The chinook salmon use these subareas to spawn, rear, and migrate to and from saltwater, so the protection and restoration of habitat in these areas is important for their continued existence.

The near-term strategy calls for a range of options – mainly protection, enhancement, restoration, regulatory, and educational – that can be undertaken quickly, usually within 2 to 5 years, and that do not require detailed analysis and planning. The benefits of these actions are considered so obvious (and presumably, the risks to the salmon so low) that further analysis is sometimes viewed as an unnecessary delay to action. In addition, these early actions must be based in sound scientific theory and practice, appropriate for the tasks involved in early conservation planning. The actions also should be designed to provide opportunities for future conservation.

The WRIA 8 Technical Committee, which is composed of scientists from across the watershed (see Chapter 9, Acknowledgements, for a roster), developed the foundation for this near-term strategy. Given scientists' somewhat limited knowledge of salmon life history needs in the Lake Washington/Cedar/Sammamish Watershed, the strategy is to be conservative and cautious in recommending actions and guidance, selecting those that are reasonably certain to benefit salmon habitat. This conservative approach was also chosen as a way to maintain a direct link between the near-term actions and the long-term conservation plan now in development. While more information is being gathered and analyzed to guide development of a long-term salmon conservation plan, the near-term strategy is intended to preserve opportunities and provide consistent direction for salmon habitat conservation for the entire watershed and its individual subareas. The goal of this strategy is to provide guidance by which implementers can link near-term actions to the long-term health of the ecosystem.

The science-based strategy addresses the factors of decline for chinook salmon habitat in the watershed and presents ecosystem objectives and guiding principles for conservation efforts. In addition, it identifies and defines core and satellite chinook production subareas as well as migratory and rearing corridor subareas in which near-term projects should be focused. The strategy also offers general guidance for actions to take anywhere within WRIA 8 and provides explanations for why each of the categories of recommended actions is important in conserving salmon habitat.

Scientific Basis of the Strategy

Factors of Decline

The near-term strategy for the Action Agenda is built on and addresses the factors of decline contributing to the loss of chinook salmon habitat in the Lake Washington/Cedar/Sammamish Watershed. These factors have been identified in the report titled *Salmon and Steelhead Habitat Limiting Factors Report for Cedar-Sammamish Basin*, developed by the Washington State Conservation Commission and the WRIA 8 Technical Committee. A summary of the factors of decline is provided in Table 2-1, below.

Table 2-1. Factors of Decline in WRIA 8

Factors of Decline in Rivers and Streams in WRIA 8

The following factors of decline are common in rivers and streams throughout WRIA 8. These are not listed in order of priority:

- Fish access and passage barriers
- Degradation of riparian conditions
- Altered hydrology and flow
- Poor water quality (temperature, other)
- Loss of channel complexity and connectivity
- Increased sedimentation and altered sediment transport processes.

Factors of Decline for Unique Subareas of WRIA 8

- **Nearshore/Estuary:** Loss of habitat in migratory and rearing corridor, alteration of habitat-forming processes, loss of riparian function, poor water quality, poor sediment quality, introduction of non-native species
- **Hiram M. Chittenden Locks:** Fish passage and access barriers, poor water quality (increased temperatures, freshwater/saltwater exchange), predation
- **Ship Canal/Lake Union:** Predation, degradation of riparian habitat conditions, poor water quality (temperature, dissolved oxygen), poor sediment quality
- **Lake Washington:** Altered trophic interactions (predation, competition), degradation of riparian shoreline conditions, altered hydrology, invasive exotic plants, poor water quality (phosphorus, alkalinity, pH), poor sediment quality
- **Lake Sammamish:** Degraded riparian shoreline conditions, predation, poor water quality (temperature, nutrients), invasive plants, poor sediment quality, altered fish species composition, altered macrophyte conditions, altered sediment transport processes, fish passage and access barriers.

Ecosystem Objectives

The WRIA 8 Technical Committee members relied upon a series of ecosystem objectives and guiding principles to inform their professional judgment in recommending general action guidance, habitat protection and restoration projects, and research. The near-term strategy is not based on extensive new scientific research or an assessment of the constraints within the watershed; however, this will be required for the development of the long-term salmon conservation plan.

The near-term strategy recognizes four ecosystem objectives for salmon habitat protection and restoration. These ecosystem objectives are the basis for developing and selecting near-term habitat actions and guidance that are responsive to the factors of decline. The objectives are to:

- Maintain, restore, or enhance watershed processes that create habitat characteristics favorable to salmon.
- Maintain or enhance habitat required by salmon during all life stages and maintain functional corridors linking these habitats.
- Maintain a well-dispersed network of high-quality refuge habitats to serve as centers of population expansion.
- Maintain connectivity between high-quality habitats to allow for population expansion into recovered habitat as degraded systems recover.

Guiding Principles

Knowledge of natural watershed processes can provide a design template for the implementation of conservation actions. However, highly altered environments throughout the Lake Washington/Cedar/Sammamish Watershed may require unique approaches that differ from complete restoration of historic natural watershed processes. The following guiding principles characterize what should be done specifically in WRIA 8 to restore the altered environment in a way that is consistent with the ecosystem objectives; the guiding principles also serve to focus the near-term actions on factors of decline.

The WRIA 8 guiding principles are to:

- Protect and restore natural physical, chemical, and biological processes and the habitats they form that are necessary for the recovery and conservation of salmon in the Lake Washington/Cedar/Sammamish Watershed.
- Protect and maintain existing quality refuge habitats from which salmon populations may expand.
- Maintain and restore the corridors that link habitats, including headwaters, channel migration zones, floodplains, wetlands, lake shorelines, estuaries, and marine nearshore habitats.
- Maintain and reconnect salmon access to freshwater, saltwater, and estuarine habitats.
- Emphasize self-sustaining, abundant, diverse, and widely distributed runs of naturally produced salmon when developing protection and restoration strategies.

- Approach the development of management actions in a scientifically rigorous manner, including the articulation of appropriate hypotheses.
- Employ scientifically rigorous adaptive management techniques, including implementation, effectiveness, and validation monitoring, to all elements of conservation activities.
- Identify, protect, and restore those areas that exhibit high existing salmon use, greatest production potential, or a high future conservation value for salmon.
- Plan, develop, and implement management actions (for example, regulations, easements, incentives) to ensure protection of biologically important areas.
- Conduct research and investigations necessary to further the understanding of watershed processes that are critical to the formation of habitat necessary for salmon conservation and survival.
- Identify and implement appropriate action alternatives responsive to habitat-limiting factors and recovery goals for naturally produced salmon.

Although the Action Agenda is not a prioritized list, the following three additional principles should help implementers to both prioritize the selection of actions and guide them in evaluating their implementation:

- Do no further harm to watershed processes, habitat structure, and aquatic functions important for salmon production.
- Conserve the best remaining habitat that supports chinook salmon spawning.
- Conserve those areas that are understood to support high chinook salmon use and productivity, including rearing and migration corridors.

Identification of Core and Satellite Production Subareas and Migratory and Rearing Corridors for Chinook Salmon Populations

While factors of decline, ecosystem objectives, and guiding principles provide the scientific basis for action, knowledge of chinook salmon population distribution and how they use their habitat is important to determine where site-specific actions should be focused. Based on current knowledge, habitat protection and restoration projects and research have been recommended for the following populations and the habitats where they are most abundant.

The near-term strategy recognizes three naturally produced populations of chinook salmon currently thought to use the habitats of the Lake Washington/Cedar/Sammamish Watershed for reproduction.

- The Cedar River stock is confined to the mainstem Cedar River and several of its tributaries that are all downstream of Landsburg Dam. This stock is believed to be unique in and to WRIA 8 primarily because only limited numbers of hatchery fish have been released into the subarea.
- The north Lake Washington tributaries stock is found in tributaries such as Bear Creek, Little Bear Creek, North Creek, and Swamp Creek.
- The Issaquah Creek stock is the third naturally produced stock.

The National Marine Fisheries Service published a public review draft in April 2001 that identifies only two populations or stocks of native or naturally produced chinook salmon: the Cedar River stock (Cedar River genetic origin) and the north Lake Washington tributaries stock, primarily from the Bear Creek basin (Green River genetic origin). The National Marine Fisheries Service also includes Issaquah Creek in its definition of the north Lake Washington tributaries' population. However, the WRIA 8 Technical Committee has chosen to identify three different populations (Cedar, north Lake Washington, and Issaquah) until additional investigations confirming the genetic relationships are completed.

The WRIA 8 Technical Committee has conducted an initial analysis of chinook salmon populations throughout WRIA 8. The analysis was designed to identify those areas, referred to as *subareas*, within the Lake Washington/Cedar/Sammamish Watershed that are used by chinook salmon for habitat at various life stages. Tables 2-2 and 2-3 provide the results of that analysis. The different subareas are defined below. (Maps depicting the WRIA 8 subareas are provided in Chapter 4, Projects and Research Recommendations Specific to Subareas, at the end of each subarea section.)

Core production subareas: Chinook salmon are present on an annual basis. This type of subarea represents the center of (highest) abundance for each population affiliation (for spawning, rearing, and migration areas). (See Table 2-2.)

Satellite production subareas: Chinook salmon are present most years (more than half the years of a typical 4- to 5-year life cycle), but are less abundant than in core areas. Records are more incomplete, efforts to gather population distribution data are inconsistent among potential satellite areas, and methods of enumeration vary. (See Table 2-2.)

Episodic use subareas: Chinook salmon are present infrequently and may not be present or observed during the typical 4- to 5-year life cycle. This indicates that when fish are observed, they are strays from another production area and not necessarily the progeny of natural production from the area in question. (See Table 2-2.)

Migatory and rearing corridor subareas: Water bodies within WRIA 8 that most chinook salmon must travel through and feed from during the course of their life cycle. (See Table 2-3.)

Table 2-2. Chinook Salmon Core and Satellite Designations of WRIA 8 Subareas

Chinook Salmon Population	Subarea	Type
Cedar River	Cedar River and Tributaries	Core
Cedar River/North Lake Washington Tributaries	Kelsey Creek [a]	Satellite
North Lake Washington Tributaries	Bear Creek	Core
	Little Bear Creek	Satellite
	Swamp Creek	Satellite
	North Creek	Satellite
	Coal Creek	Episodic
	May Creek	Episodic
	Juanita Creek	Episodic
	Thornton Creek	Episodic
	McAleer Creek	Episodic
Issaquah Creek	Issaquah Creek	Core
	Lewis Creek	Episodic
	Laughing Jacobs Creek	Episodic
Independent	Pipers Creek	Episodic

[a] It is not known which genetic population the Kelsey Creek stock belongs to: the North Lake Washington tributaries stock or the Cedar River stock.

Table 2-3. Migratory and Rearing Corridors in WRIA 8

Subarea	Type
Nearshore/Estuary	Migratory and rearing corridor
Hiram M. Chittenden Locks	Partial migratory barrier
Ship Canal/Lake Union	Migratory and possible rearing corridor
Lake Washington	Migratory and rearing corridor
Lake Sammamish	Migratory and possible rearing corridor
Sammamish River	Migratory and possible rearing corridor

Two key additional points must be kept in mind about population and habitat information. First, for the system to ultimately function naturally, all habitat should be considered important regardless of whether or not chinook salmon use it regularly or less frequently. Second, much more knowledge needs to be gained about the importance of habitat characterized as episodic to determine why salmon are using that type of habitat less frequently.

The near-term strategy's basis in ecosystem objectives calls for actions to be taken across the range of habitat uses. The migratory and rearing corridor subareas (listed in Table 2-3) through which most chinook salmon must travel during the course of their life cycle also support population productivity and are likely problem areas for fish survival, given historic hydrologic changes, altered trophic interactions (feeding relationships), and extensive development. Therefore, the Nearshore/Estuary, Hiram M. Chittenden Locks, Ship Canal/Lake Union, Lake Washington, Sammamish River, and Lake Sammamish are also high-priority areas for near-term actions.

Categories of Actions

General Action Guidance

The central focus of the Action Agenda is to recommend actions to take now to address the identified factors of salmon habitat decline. The near-term strategy lays out ecosystem objectives and guiding principles to consider when taking action. However, in addition to addressing the theoretical strategy and the recommendations for specific projects at specific locations, there is a need for general guidance and criteria.

For example, as research is completed and results are analyzed, new projects not contemplated in the Action Agenda or that could occur outside the core and satellite production subareas may become relevant. In addition, because the watershed is an interconnected ecosystem, actions can be taken even in those areas where the benefits to salmon are not immediately apparent. The general action guidance offered in Chapter 3 is to be used in conjunction with the guiding principles to develop unlisted projects. This will ensure a consistency of purpose and facilitate more beneficial actions in the near term. The general guidance will also be useful in identifying additional regulatory and programmatic actions.

Following the general guidance, tiered criteria are listed in Chapter 3 to help implementers choose potential near-term actions, structure actions not covered in the Action Agenda, and set priorities for taking action.

Project and Research Recommendations Specific to Subareas

The Action Agenda includes recommendations for an initial list of habitat protection and restoration projects and research that are designed to address factors of decline by subareas. (Please see Chapter 4, Project and Research Recommendations Specific to Subareas.)

Based on the near-term strategy above, the following project types are appropriate to undertake in the next 2 to 5 years:

- Habitat acquisition for protection, restoration, and/or enhancement of watershed (especially hydrologic), floodplain, and riparian/nearshore processes. (Acquisition primarily for in-stream habitat restoration, in the

absence of a strategic watershed assessment, is not supported at this time. Please see the third item in this list.)

- Reconnection or restoration of fish access to potentially productive stream reaches in the drainage network. For example, prioritized culvert/fishway removal, replacement, or repair.

- Reconnection, restoration, and/or enhancement of floodplain and nearshore habitats. For example, removal of channel or nearshore hydromodifications such as dikes, revetments, overwater structures, and bulkheads. Bank stabilization in river environments, in principle, is not supported, as the goal is to recover channel migration, floodplain, and riparian processes as well as habitat structure and functions.

- Restoration of native riparian plant communities.

Special note: Proposed projects may provide additional habitat benefits by including additional structural enhancements, such as engineered log jams, constructed off-channel habitat, and others. Before adding these or other elements to a project, the following points should be considered:

- There is a documented need for the function provided by the structure.

- All site-specific and stream reach and shoreline hydrogeomorphic analyses supporting the project design have been conducted and peer-reviewed for risk of failure.

- Additional project prioritization criteria and project monitoring objectives should be followed as outlined in Chapter 3, General Action Guidance, and Chapter 7, Adaptive Management, Monitoring, and Research.

Regulatory and Policy Guidance

Without regulations and policies that guide land use actions, habitat management alone can only slow the rate of species decline, not recover it. Regulatory and programmatic components of the Action Agenda are necessary tools for salmon habitat conservation because they are preventive – they can discourage the degradation of habitat before it starts. A key element of the near-term strategy is to protect and preserve the best remaining habitat. This cannot be accomplished through on-the-ground restoration alone.

The Action Agenda includes guidance for specific regulatory and policy review. (Please see Chapter 5, Regulatory and Policy Recommendations.) These recommendations address many of the factors of decline and reflect the best professional judgment for what can be accomplished at this time.

Education and Public Involvement

Salmon conservation has a better chance of succeeding if it is supported by the community. Changes in policy and commitment of restoration resources will be easier and more appropriate if a significant portion of the public understands and supports the changes that scientific analysis suggests are necessary. To generate awareness, encourage involvement, and engage support for salmon conservation over the long term, education and outreach programs must begin now. A base of knowledge and understanding needs to be built and maintained to elicit the active involvement of citizens and elected officials in determining workable conservation actions and their successful implementation. Therefore, ongoing communication with and education of the public are essential.

Public involvement and education programs initiated under the Action Agenda (please see Chapter 6, Education and Public Involvement) address at least one factor of decline and strive to be consistent with the Action Agenda's guiding principles.

Research, Monitoring, and Adaptive Management

Although there is excellent general information about chinook salmon and watershed conditions in WRIA 8, detailed knowledge of the factors influencing salmon decline in the individual subareas is lacking. This information will be obtained through research and analysis as part of a strategic assessment, in which the appropriate sequencing and scale of research questions will be defined. Questions for evaluating research options include:

- How much is currently known about salmon and salmon habitat in the Lake Washington/Cedar/Sammamish Watershed?
- How will filling the gaps in information improve the ability to develop conservation efforts?

Another form of research is the monitoring of salmon habitat, population, and restoration projects, which is a critical component of a successful adaptive management program (discussed below).

Specific recommendations for research are provided in Chapter 4, Project and Research Recommendations Specific to Subareas. General research guidance can be found in Chapter 7, Adaptive Management, Monitoring, and Research.

The science of salmon recovery is evolving, and actions taken through watershed planning and the Action Agenda may need to be modified over time. Most of the recommendations in the Action Agenda have not undergone rigorous scientific analysis to confirm their value. However, some uncertainty is acceptable if the actions can be modified and adjusted as they are implemented. Monitoring and adaptive management should be fundamental components of every project. This approach allows actions to be taken using the most current information,

while maintaining the flexibility to adjust as implementation reveals results and analysis suggests course corrections.

In addition, it is important to monitor and assess how well implementation of conservation programs supports salmon recovery goals. An adaptive management program calls for public and private entities to learn from their actions through rigorous evaluation. Adaptive management is a systematic process for gathering and analyzing information to inform decision-making and the implementation of actions. Specific recommendations for monitoring and adaptive management are provided in Chapter 7.